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Test 841: Oliver 1600

NEBRASKA TRACTOR TEST 841 - OLIVER 1600 GASOLINE

The University of Nebraska Agricultural Experiment Station
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POWER TAKE-OFF PERFORMANCE

Hp	Crank-shaft speed rpm	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Temperature Degrees F Air wet bulb	Temperature Degrees F Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO 1008 rpm)								
56.50	1900	5.413	0.587	10.44	179	66	75	28.680
Standard Power Take-off Speed (540 rpm)—One Hour								
51.18	1740	4.988	0.597	10.26	176	72	78	28.760
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
49.75	1968	5.172	0.637	9.62	179	66	79	.....
0.00	2129	1.693	.....	.....	177	67	80	.....
25.32	2003	3.220	0.780	7.86	179	66	80	.....
56.48	1900	5.378	0.584	10.50	181	67	82	.....
12.94	2048	2.403	1.138	5.38	178	67	82	.....
37.68	1987	4.125	0.671	9.13	179	68	83	.....
Av 30.36	**2006**	**3.665**	**0.740**	**8.28**	**179**	**67**	**81**	**28.703**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cool-ing med	Temp Degrees F Air wet bulb	Temp Degrees F Air dry bulb	Barometer inches of Mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—4th Gear Hydra-Power											
47.09	3942	4.48	1901	5.14	5.188	0.676	9.08	184	76	84	28.730
75% of Pull at Maximum Power—Ten Hours—4th Gear Hydra-Power											
38.55	3074	4.70	1968	3.81	4.611	0.733	8.36	184	69	79	28.726
50% of Pull at Maximum Power—Two Hours—4th Gear Hydra-Power											
26.94	2091	4.83	1999	2.65	3.693	0.840	7.29	187	68	83	28.773
MAXIMUM POWER WITH BALLAST											
37.56	8490	1.66	1982	14.21	1st Gear Hydra-Power			185	58	66	28.880
44.65	7544	2.22	1898	12.19	1st Gear			185	68	86	28.660
45.77	6929	2.48	1897	10.72	2nd Gear Hydra-Power			185	67	83	28.660
46.55	6079	2.87	1901	9.20	3rd Gear Hydra-Power			185	68	85	28.660
46.86	4980	3.53	1902	6.86	2nd Gear			185	68	85	28.670
47.94	4451	4.04	1901	6.07	3rd Gear			190	60	69	28.880
48.85	4107	4.46	1900	5.54	4th Gear Hydra-Power			188	60	70	28.880
48.81	3278	5.58	1891	4.25	5th Gear Hydra-Power			188	60	70	28.880
48.30	2934	6.17	1898	3.77	4th Gear			188	60	70	28.880
47.74	2313	7.74	1901	3.07	5th Gear			188	62	73	28.880
45.77	1767	9.71	1899	2.36	6th Gear Hydra-Power			185	63	75	28.870
42.35	1188	13.37	1906	1.65	6th Gear			185	63	75	28.870
MAXIMUM POWER WITHOUT BALLAST											
47.02	3933	4.48	1899	5.86	4th Gear Hydra-Power			195	76	91	28.660

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST
4th Gear Hydra-Power

Pounds pull	4107	4211	4273	4363	4401	4288
Horsepower	48.85	45.10	40.44	36.07	30.98	25.25
Crankshaft speed rpm	1900	1714	1515	1326	1131	944
Miles per hour	4.46	4.02	3.55	3.10	2.64	2.21
Slip of drivers %	5.54	5.67	5.81	5.81	5.94	5.94

TIRES, BALLAST and WEIGHT		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 16.9-34; 6; 16	Two 16.9-34; 6; 16
Ballast	—Liquid	888 lb each	None
	Cast iron	725 lb each	None
Front tires	—No, size, ply & psi	Two 6.50-16; 6; 36	Two 6.50-16; 6; 28
Ballast	—Liquid	None	None
	Cast iron	190 lb each	None
Height of drawbar		19½ inches	20½ inches
Static weight	—Rear	8340 lb	5115 lb
	—Front	2420 lb	2040 lb
Total weight with operator		10935 lb	7330 lb

Department of Agricultural Engineering

Dates of Test: June 3 to June 13, 1963

Manufacturer: OLIVER CORPORATION, CHARLES CITY, IOWA

Manufacturer's Power Rating: Not rated

FUEL, OIL and TIME Fuel regular gasoline **Octane No** Motor 84.4 Research 92.2 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.7365 **Weight per gallon** 6.131 lb **Oil** SAE 10W **API service classification** MS, DM **To motor** 1.977 gal **Drained from motor** 1.906 gal **Transmission and final-drive lubricant** SAE 80 **Total time engine was operated** 44½ hours.

ENGINE Make OLIVER GASOLINE **Type** 6 cylinder vertical **Serial No** 38719 **Crankshaft mounted** lengthwise **Rated rpm** 1900 **Bore and stroke** 3½" x 4" **Compression ratio** 8.5 to 1 **Displacement** 231 cu in **Carburetor size** 1¼" **Ignition system** battery **Cranking system** 12 volt electric **Lubrication** pressure **Air cleaner** oil washed wire screen **Oil filter** full flow replaceable paper element **Oil cooler** engine coolant heat exchanger for Hydra-Power oil **Fuel filter** screen in sediment bowl **Muffler** was used **Cooling medium temperature control** thermostat.

CHASSIS Type standard **Serial No** 127-900-607 **Tread width** rear 56½" to 89$^{7}/_{16}$" front 60" to 84" **Wheel base** 105$^{7}/_{16}$" **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 28.2" Vertical distance above roadway 32.4" Horizontal distance from center of rear wheel tread 0" to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial range operator controlled power shifting **Advertised speeds mph** first 2.52 second 3.78 third 4.29 fourth 6.43 fifth 7.98 sixth 13.57 reverse 2.92 and 4.97 (using Hydra-Power drive) first 1.85 second 2.77 third 3.15 fourth 4.72 fifth 5.86 sixth 9.96 reverse 2.14 and 3.65 **Clutch** single plate dry disc operated by foot pedal **Brakes** double disc operated by two foot pedals that can be locked together **Steering** hydraulic with power assist **Turning radius** (on concrete surface with brake applied) right 146" left 146" (on concrete surface without brake) right 166" left 166" **Turning space diameter** (on concrete with brake applied) right 300" left 300" (on concrete surface without brake) right 340" left 340" **Belt pulley** 1000 rpm at 1750 engine rpm diam 11$^{7}/_{16}$" face 8" Belt speed 3000 fpm Power take-off 1008 rpm at 1900 engine rpm and 543 PTO rpm at 1750 engine rpm.

REPAIRS and ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 841.

L. F. LARSEN
Engineer-in-Charge

L. W. HURLBUT, Chairman
G. W. STEINBRUEGGE
J. J. SULEK
Board of Tractor Test Engineers

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ the 85% torque; maximum power, ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

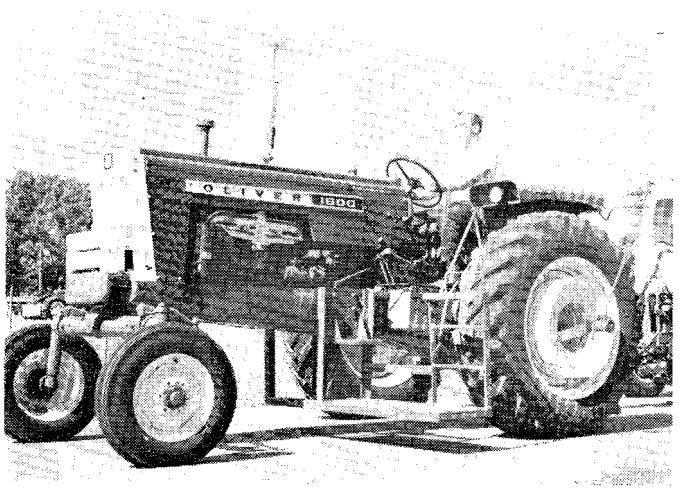
Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.**



Oliver 1600 Gasoline